# Year 9 Term 1

| Chapter | Emerging | Developing | Secure | Excelling |
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| Whole numbers and decimals<br><br>(Number) | ● Add, subtract, multiply and divide integers.<br>● Identify factors and multiples and test numbers for divisibility. Identify prime numbers. | ● Order, add and subtract negative numbers and decimals.<br>● Multiply and divide by 10, 100, 0.1 and 0.01.<br>● Use BIDMAS rules to do a calculation in the correct order.<br>● Find lowest common mulitples (LCM) and highest common factors (HCF).<br>● Round whole numbers and decimals. | ● Recognise and use cube and square numbers, cube roots and square roots.<br>● Write a number as the product of its prime factors.<br>● Round numbers to a given number of significant figures. | ● Use trial-and-improvement to find square and cube roots.<br>● Multiply and divide numbers written in index form.<br>● Use prime factors to find HCF and LCM of pairs of numbers.<br>●Find upper and lower bounds of a calculation or measurement. |
| Measures, perimeter and area<br><br>(Geometry and measures) | ● Use, read and write standard metric units.<br>● Calculate the perimeter and area of a rectangle and shapes made from rectangles. | ● Convert one metric unit to another.<br>● Calculate the area of a triangle, parallelogram and trapezium.<br>● Know the names of parts of a circle.<br>● Read and interpret scales on a range of measuring instruments. | ● Convert between metric and imperial units.<br>● Calculate the perimeter and area of 2D shapes.<br>● Recognise and use common compound measures.<br>● Use appropriate metric units to measure length, mass, capacity and area. | ● Understand whether a formula represents a length, area or volume.<br>● Use pi to calculate the circumference of a circle.<br>● Calculate the area of a circle.<br>● Understand and use compound measures for speed, density and pressure. |
| Expressions and formulae<br><br>(Algebra) | ● Use symbols to make simple expressions. | ● Simplify expressions by collecting like terms.<br>● Recognise and write formulae.<br>● Expand single brackets. | ● Multiply and divide algebraic terms.<br>● Substitute values into formulae or simple algebraic expressions.<br>● Factorise an expression by taking out a common factor. | ● Add and subtract simple algebraic fractions.<br>● Change the subject of a formula.<br>● Use index notation (including negative indices) and basic index laws. |

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| Fractions, decimals and percentages<br><br>(Number) | ●Simplify equivalent fractions.<br><br>●Add and subtract fractions with same denominator.<br><br>●Find a fraction of a quantity.<br><br>●Multiply and dividide integers by a fraction. | ●Understand, compare and order decimals.<br><br>●Order fractions<br><br>●Express one number as a fraction of another. | ●Express one number as a percentage of another.<br><br>●Convert between percentages, decimals and fractions and order them.<br><br>●Add and subtract fractions with different denominators.<br>●Calculate percentages of an amount and percentage changes. | ●Add and subtract mixed numbers.<br><br>●Multiply and divide fractions.<br><br>●Calculate an original amount from the result of a percentage change.<br>●Calculate a percentage increase or a percentage decrease.<br>●Calculate a repeated percentage increase and decrease. |
| Angles and 2D shapes<br><br>(Geometry and measures) | ●Use the sum of angles at a point and on a straight line to solve problems.<br><br>●Recognise vertically opposite angles.<br><br>●Classify triangles and quadrilaterals.<br><br>●Use the facts about angles in triangles to solve problems. | ●Work with angles at a point and on a line.<br><br>●Work with angles in a triangle.<br><br>●Work with angles on parallel and intersecting lines.<br>●Recognise parallel and perpendicular lines. | ●Reason geometrically using the properties of angles at a point, on a line and intersecting and parallel lines.<br>●Recognise quadrilaterals and know their properties.<br>●Know and use some properties of polygons.<br><br>●Recognise congruent shapes.<br><br>●Identify and use congruent shapes. | ●Recognise the different types of triangles and quadrilaterals and use their properties.<br><br>●Recognise the different types of polygons and calculate interior and exterior angles for regular polygons.<br><br>●Use the properties of a circle to calculate angles.<br>●Calculate an arc length and sector area of a circle. |
| Graphs<br><br>(Algebra) | ●Read and plot coordinates in all four quadrants.<br>●Use a table of vaues to draw a straight-line graph.<br>●Identify the equations of, and draw horizontal and vertical graphs.<br>●Use real-life graphs and conversion graphs. | ●Draw a straight-line graph of a function.<br><br>●Interpret and draw real-life graphs.<br><br>●Create and use formulae.<br><br>●Plot and interpret time series graphs.<br><br>●Recognise the equations of sloping lines and lines parallel to the axes. | ●Plot the graph of a linear function.<br><br>●Find the midpoint of a pair of coordinates.<br>●Relate gradient and y intercept to the genreal equation y = mx + c.<br>●Plot graphs of linear functions and find gradients.<br>●Find the equation of straight-line graphs.<br><br>●Plot and interpret distance-time graphs. | ●Use the equation of a straight line.<br><br>●Plot the graph of an implicit function.<br><br>●Read and interpret exponential and reciprocal graphs.<br>●Recognise and plot graphs of simple quadratic functions.<br>●Recognise and plot graphs of cubic functions. |

# Year 9 Term 2

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| Mental Calculations<br><br>(Number) | ●Use the order of operations, including brackets.<br>●Use mental methods to add, subtract, multiply and divide.<br>●Solve problems using addition, subtraction, multiplication and division.<br>●Use long multiplication.<br>●Multiply decimals by a single digit number. | ●Round to the nearest whole number, 10, 100 and 1000.<br>●Round to a given decimal place.<br>●Use rounding to estimate and approximate.<br>●Use a calculator to interpret the remainder in a division calculation.<br>●Use short and long division. | ●Use the rules of arithmetic with negative numbers.<br>●Multiply and divide a number by 10, 100 and 1000, and 0.1 and 0.01.<br>●Solve problems using mental strategies by breaking the problems down into smaller steps.<br>●Use the function keys on a calculator and interpret the display. | ●Calculate with positive and negative powers of ten.<br>●Use standard written methods for addition and subtraction with whole numbers and decimals.<br>●Use a range of mental and written strategies for decimal calculations. |
| Statistics<br><br>(Statistics and probability) | ●Plan a survey and collect data.<br>●Use frequency tables.<br>●Construct bar charts. | ●Construct pie charts.<br>●Construct frequency diagrams (including grouped data).<br>●Find the mean, mode, median and range of a list of numbers. | ●Calculate averages, including from a frequency tables.<br>●Construct scatter diagrams and understand correlation.<br>●Draw and interpret stem and leaf diagrams.<br>●Estimate averages from grouped tables<br>●Make comparisons between sets of data.<br>●Plot and analyse time-series graphs. | ●Create and interpret a grouped frequency table.<br>●Compare distributions<br>●Draw a frequency polygon.<br>●Find the trends using moving averages.<br>●Draw and use a cumulative frequency graph.<br>●Use box plots to make comparisons between data sets. |
| Transformations and symmetry<br><br>(Geometry and measures) | ●Rotate shapes on a square grid through different angles.<br>●Recognise reflection and rotational symmetry of 2D shapes.<br>●Use vectors to translate shapes in any direction.<br>●Translate shapes. | ●Make tessellating patterns.<br>●Reflect, rotate and translate 2D shapes.<br>●Enlarge shapes using whole number and fractional scale factors. | ●Recognise reflection and rotation symmetry.<br>Carry out and specify rotations, reflections and translations.<br>●Enlarge a 2D shape using a given centre of enlargement.<br>●Use and interpret maps and scale drawings.<br>●Use bearings to specify direction. | ●Carry out and specify rotations, reflections and translations.<br>●Carry out combinations of transformations.<br>●Enlarge 2D shapes using positive and negative scale factors.<br>●Calculate unknown lengths in similar shapes. |

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| Equations<br><br>(Algebra) | ●Solve one-step equations using inverses and balancing.<br>●Form and solve equations from word problems.<br>●Understand what an equation is. | ●Make equations from real situations.<br>●Solve real life equations.<br>●Solve two-step equations.<br>●Solve equations including with bracket and fractions | ●Solve multi-step equations including with the unknowns on both sides.<br>●Use trial and improvement to solve equations<br>●Find approximate solutions to equations using trial and improvement.<br>●Solve linear equations with brackets and algebraic fractions. | ●Solve linear equations that involve negative numbers.<br>●Solve linear inequalities with one variable.<br>●Solve simultaneous equations by elimination.<br>●Solve simultaneous equations by drawing graphs. |
| Written and calculator methods<br><br>(Number) | ●Use the column method to add and subtract whole numbers and decimals.<br>●Use the standard method to multiply whole numbers.<br>●Use long and short division.<br>●Identify and understand square numbers.<br>●Multiply and divide numbers by powers of 10. | ●Use the order of operations.<br>●Simplify expressions using indices.<br>●Write numbers in standard form.<br>●Find square and cube roots. | ●Use mental methods for multiplication and division.<br>●Solve problems using standard methods for addition, subtraction, multplication and divison.<br>●Simplify surds.<br>●Convert to and from standard index form.<br>●Write numbers in standard form | ●Use a calculator to calculate with powers, roots, brackets and fractions.<br>●Calculate with standard form.<br>●Know and use the index laws.<br>●Know and use rules for surds.<br>●Use index notation for square and cube roots. |
| Constructions<br><br>(Geometry and measures) | ●Measure and draw lines and angles accurately.<br>●Construct a triangle given two angles and the side between them (ASA).<br>●Construct a triangle given two sides and the angle between them (SAS).<br>●Construct a triangle given three sides (SSS). | ●Construct angle bisectors, perpendicular bisectors and perpendicular lines.<br>●Draw and use scale drawings to represent real-life objects.<br>●Construct ASA, SAS, SSS and RHS triangles. | ●Describe the locus of a point and draw it accurately.<br>●Interpret scale drawings and maps using ratios.<br>●Construct the perpendicular from a point on a line and the perpendicular from a point to a line.<br>●Use three figure bearings. | ●Draw the locus of a point from a give rule.<br>●Understand and use Pythagoras' theorem.<br>●Use Pythagoras' theorem in real-life contexts. |

# Year 9 Term 3

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| Sequences<br><br>(Algebra) | ●Find and use rules that describe sequences of numbers.<br>●Use position-to-term rules to generate sequences. | ●Find and use the term-to-term rule in a sequence.<br>●Understand the connection between triangular numbers and square numbers.<br>●Use sequences to solve real life problems. | ●Find and use nth term.<br>●Describe a sequence using a recursive formula.<br>●Recognise and describe geometric sequences. | ●Generate sequences using a recursive formula.<br>●Explore the long-term behaviour of a sequence defined recursively.<br>●Find a position-to-term (nth) rule for a quadratic sequence. |
| Ratio and proportion<br><br>(Ratio and proportion) | ●Simplify equivalent ratios.<br>●Use multipliers to solve ratio and proportion problems.<br>●Express an amount as a percentage of another amount. | ●Compare simple proportions by converting to percentages.<br>●Solve problems that involve direct proportion.<br>●Divide quantities in a given ratio.<br>●Calculate percentage increase and decreases. | ●Use percentages to compare more complex proportions.<br>●Describe proportion using fraction notation.<br>●Calculate fractional change. | ●Solve problems involving ratio.<br>●Solve problems using direct proportion and scale factors.<br>●Interpret maps and scale drawings.<br>●Solve problems involving proportional reasoning, including financial problems. |
| 3D shapes<br><br>(Geometry and measures) | ●Recognise and name 3D shapes.<br>●Use isometric drawings to visualise 3D shapes.<br>●Use nets of 3D shapes.<br>●Classify 3D shapes and draw 2D representations. | ●Find the volume of a 3D shape by counting cubes.<br>●Find the volume of shapes made from cuboids.<br>●Draw the plans and elevations of a 3D shape.<br>●Identify planes of symmetry. | ●Calculate the surface area and volume of cuboids.<br>●Calculate the volume of prisms.<br>●Calculate the surface area of a prism. | ●Use Pythagoras' theorem in three dimensions.<br>●Use sine, cosine and tangent to find lengths and angles in right angled triangles.<br>●Use trigonometry in calculations with bearings. |
| Probability<br><br>(Statistics and probability) | ●Understand and use the probability scale from 0 to 1.<br>●Use vocabulary to describe the likelihood of events.<br>●Find probabilities based on equally likely outcomes.<br>●Find the probabilities for mutually exclusive events. | ●Use diagrams and tables to record mutually exclusive outcomes.<br>●Estimate probabilities by collecting data from an experiment.<br>●Calculate the probability that an event does not occur from the probability that it does occur.<br>●Use experiments to estimate probabilities.<br>●Systematically list the outcomes for combined events. | ●Compare experimental probabilities with theoretical probabilities.<br>●Use a tree diagram to list outcomes and calculate probabilities.<br>●Analyse the frequency of outcomes of simple probability experiments.<br>●Enumerate sets using Venn diagrams.<br>●Evaluate uncertainty and risk in real situations | ●Identify mutually exclusive events and calculate their probabilities.<br>●Estimate probabilities using experiments and compare the results to theoretical models.<br>●Use random numbers to simulate real world data.<br>●Use Venn diagrams to calculate probabilities.<br>●Identify and calculate probabilities for independent events. |